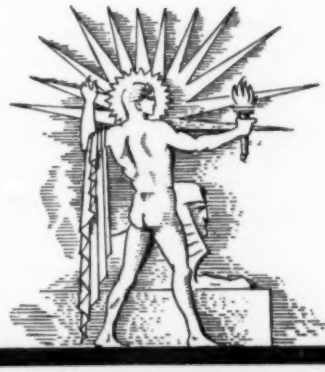
TECHNOLOGY DEPT.

PUBLIC LIBRARY
JUL 18 1939
DETROIT

PRICE 15¢

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



July 15, 1939

Prospecting

See page 36

A SCIENCE SERVICE PUBLICATION

Do You Know?

A cutworm is the caterpillar stage of a night-flying moth.

Wet leaves should always be treated as a driving hazard, warns one tire manufacturer.

CCC boys digging a trench for a power cable near Santa Barbara, California, discovered ruins of a huge Indian barracks, once part of La Purisima Mission.

At least 5,000,000 persons in the United States have now been treated with the new and often life-saving chemical remedy, sulfanilamide, it is estimated.

Leonardo da Vinci's mechanical inventions—of which he left sketches—included printing presses, an oil press, screw-cutting lathe, and pile driver with automatic release.

It is believed that there was no pellagra in Europe before corn was introduced, this malnutrition disease being linked with diet in which corn is the main cereal.

Soil for a window box, says Cornell University, should be about three-fourths good garden soil and one-fourth leaf mold, peat, or well-rotted manure, with superphosphate added at the rate of one cup for each bushel of soil.

The late Fred Snare, British maker of gun-flints, was the last of a family of flint-knappers that traced its occupation back to 1066, when a direct ancestor was ordered by William the Conqueror to repair a flint church wall in Kent.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

AERONAUTICS

What are the newest materials now being tried for the harness of parachutes? p. 40.

How many blades have the propellers of the new army planes? p. 45.

ARCHAEOLOGY

How many documents have been discovered at the newly-found Nestor's Palace? p. 38.

ASTRONOMY

What periodic comet is now back in the region of the sun and earth after a seven-year absence? p. 44.

CHEMISTRY

If rubber is properly stored, how long will it last in good condition? p. 41.

GENERAL SCIENCE

How is German science bearing up under the impact of Nazi rule? p. 36.

GEOGRAPHY

On what sort of terrain are the Soviets and Japanese struggling in their Far-East war? p. 39.

GEOLOGY

What is the new way of taking samples from deep wells? p. 36.

INVENTION

How are rockets controlled in flight? p. 46.

MEDICINE

How are X-rays now aiding the fight against tuberculosis? p. 43.

METEOROLOGY

What is the long range weather forecast for temperatures of the current summer? p. 44.

OCEANOGRAPHY

What new food is Germany now trying to get from the sea? p. 46.

PHYSICS

Just what is the "power of words" according to physical measurements? p. 40.

What is the approximate atomic weight of the super-heavy elements whose transmutations have been suggested as the origin of cosmic rays? p. 35.

PSYCHOLOGY

What kind of music are experts suggesting will be needed to arouse enlistments in the next war? p. 42.

How can the eye fool the novice camera fan? p. 41.

PUBLIC HEALTH

What led to the abandonment of North Dakota's health program for medical care? p. 37.

What is the latest fever which science has discovered can be transmitted by water? p. 35.

The most densely motorized area in the world is the metropolitan area of Los Angeles—one vehicle for every 2.8 persons.

A naturalist in the National Park Service is directing a group of school children in Washington, D. C., to plan and label a nature trail.

There should be 2,360,000 grains of sugar in a pound when you buy it, judging by a report that one grain of sugar weighs 68 ten-millionths of an ounce.

An image on the retina of the eye lingers for a fraction of a second after the object is withdrawn from range of vision.

Home life among the raccoons is ideal, says the National Park Service—the male shares responsibility of rearing and training the children.

The volume of water now held behind Federal irrigation dams in the West ready for use in dry summer is reported greater than ever before.

SCIENCE NEWS LETTER

Vol. 36 JULY 15, 1939 *No. 3*

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 2101 Constitution Avenue, Washington, D. C. Edited by WATSON DAVIS.

Subscriptions—$5.00 a year; two years $7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

In requesting change of address, please give your old address as well as the new one, at least two weeks before change is to become effective.

Copyright, 1939, by Science Service, Inc. Republication of any portion of SCIENCE NEWS LETTER is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service.

Cable address: Scienserve, Washington.

Entered as second class matter at the post-office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and in the Engineering Index.

Members of the American Association for the Advancement of Science have privilege of subscribing to SCIENCE NEWS LETTER at $3 a year.

The New York Museum of Science and Industry has elected SCIENCE NEWS LETTER as its official publication to be received by its members.

Advertising rates on application. Member Audit Bureau of Circulation.

SCIENCE SERVICE is the Institution for the Popularization of Science organized 1921 as a non-profit corporation, with trustees nominated by the National Academy of Sciences, the National Research Council, the American Association for the Advancement of Science, the E. W. Scripps Estate and the journalistic profession.

Board of Trustees—*Honorary President*: William E. Ritter, University of California. Representing the American Association for the Advancement of Science: J. McKeen Cattell, Editor, Science; Henry B. Ward, University of Illinois; Edwin G. Conklin, *President*, American Philosophical Society. Representing the National Academy of Sciences: W. H. Howell, *Vice-President and Chairman of Executive Committee*, Johns Hopkins University; R. A. Millikan, California Institute of Technology; Harlow Shapley, Harvard College Observatory. Representing National Research Council: C. G. Abbot, Secretary, Smithsonian Institution; Harrison E. Howe, Editor, Industrial and Engineering Chemistry; Ross G. Harrison, Yale University. Representing Journalistic Profession: John H. Finley, Editor, New York Times; J. Edwin Murphy, Managing Editor, Baltimore Evening Sun; O. W. Riegel, Washington and Lee School of Journalism. Representing E. W. Scripps Estate: Harry L. Smithton, *Treasurer*, Cincinnati, Ohio; Warren S. Thompson, Miami University, Oxford, Ohio; W. W. Hawkins, Scripps Howard Newspapers.

Staff—Director, Watson Davis; Writers, Frank Thone, Emily C. Davis, Jane Stafford, Marjorie Van de Water, Robert Potter, Leonard H. Engel; Correspondents in principal cities and centers of research. Photography: Fremont Davis; Librarian: Minna Gill; Sales and Advertising: Hallie Jenkins, Austin Winant, Howard Bandy.

PHYSICS

Super-Heavy Elements May Be Stuff of Dense Dwarf Stars

Material 10,000 Times as Massive as Any on Earth Would Yield Cosmic Ray Energies When Atoms Split

THE astounding picture of cosmic rays generated in the dense white dwarf stars of the universe by the splitting of super-heavyweight elements, nearly 10,000 times as massive as any known on earth, is suggested by Dr. Felix Cernuschi, Argentine exchange scholar at Massachusetts Institute of Technology.

To generate cosmic ray particles of 1,000,000,000,000 electron-volts, like those which have been observed, requires elements having atomic number 10,000 and atomic weight 26,000. (The heaviest element found on the earth is uranium of atomic number 92 and atomic weight 238.)

In a report to the Physical Review, published today, Dr. Cernuschi suggests that the kind of splitting recently found to occur in uranium under neutron bombardment—which makes a single uranium atom liberate about 200,000,000 electron-volts of energy—is possibly going on in his hypothetical super-heavy elements too.

His X elements, or whatever name they may be given, would break down into two fission elements having atomic number 5,000 each. And then these would each in turn go into an element of 2,500 atomic number and so on; all the while liberating tremendous quantities of atomic energy that would appear both as light and as invisible atomic particles (the cosmic rays).

The new Cernuschi hypothesis is not only intriguing because it is the first application of the new uranium splitting phenomenon to cosmic ray theory but also because the suggestion of super-heavyweight elements would account for the known dense white dwarf stars.

These stars, like the small dwarf companion of the bright star Sirius, are known to have a density 50,000 times as great as water. A cubic inch of the material from this star would weigh tons.

It has previously been suggested that such stars were "collapsed" stars consisting only of neutron particles. Dr. Cernuschi's suggestion gives an alternative explanation which possesses the additional virtue of providing a reasonable explanation of the origin of cosmic rays.

Prof. M. S. Vallarta of M.I.T., well known for his studies and calculations in astrophysics and cosmic rays, was the faculty adviser of Dr. Cernuschi for the new hypothesis.

Drs. W. Baade and Fritz Zwicky of California Institute of Technology have suggested that super-novae stars (having a brightness of more than 630,000,000 times that of our sun) were exploding stars and the place of origin of super-high energy particles like those found in cosmic rays.

Dr. Vernuschi says he is unable to agree with parts of their reasoning as to this origin of cosmic rays and adds that no known atomic transmutations appear sufficient to account for the tremendous energies cosmic rays possess. Hence he calls on his new hypothesis of the fission of super-heavyweight elements.

Science News Letter, July 15, 1939

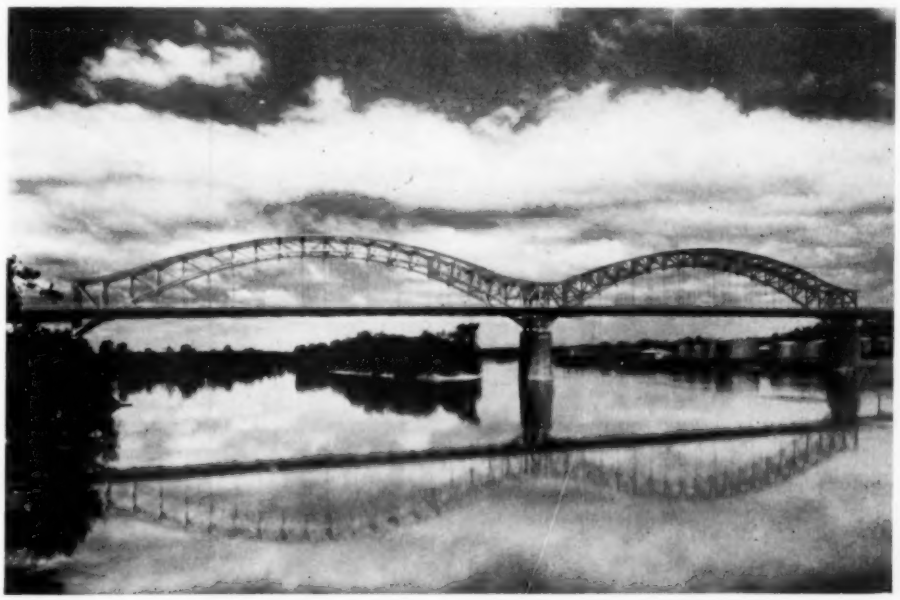
PUBLIC HEALTH

Undulant Fever Can Be Spread by Water

UNDULANT fever can be spread by water, it is now known. This disease, serious, long-drawn out and marked by frequent relapses, has hitherto been thought to spread only through the milk or meat of infected domestic animals, particularly cows, goats and pigs. Other names for the ailment are brucellosis, from the family name of the germs, brucella, and Malta fever, from the island of Malta where it was first differentiated from other fevers.

The first outbreak of water-borne undulant fever in this country, with 80 cases and one death, is described by Dr. Don W. Gudakunst, formerly Michigan State Commissioner of Health, and members of his staff, in the current issue of the *American Journal of Public Health*.

The outbreak occurred under rather special conditions, so that scientists feel that infected meat and milk are still the chief means by which this disease is



MOST BEAUTIFUL

Given an award by the American Institute of Steel Construction as the most beautiful monumental bridge constructed during 1938, is this $3,000,000 structure at Middletown, Conn. It was designed by William G. Grove under the direction of L. G. Sumner, engineer of bridges and structures, Connecticut State Highway Department.

likely to spread among the general population. The water-borne epidemic, however, not only shows the possibility of the disease spreading through water but emphasizes again the health dangers of faulty plumbing.

Faulty plumbing was part of the combination of circumstances that led to the outbreak, which occurred on the campus of Michigan State College. The epidemic was limited to persons who had been in the bacteriology building, where the undulant fever germ was being studied. Only a few of the patients, however, had handled the germs. These got into the building's water supply from the dishes and test tubes used in growing and studying them.

Ordinarily dishes in which germs are grown are sterilized before being washed. This procedure was followed but the sterilization was inadequate. On top of this, the plumbing was such that the water in which the contaminated dishes were washed could be siphoned back into the water supplied to other parts of the building.

Science News Letter, July 15, 1939

GENERAL SCIENCE

German Science Decline Reported in AASW Survey

WHAT IS happening to German science under impact of National Socialism is reported in a documented report prepared by the American Association of Scientific Workers' Boston-Cambridge Branch. Upon such findings this young but active organization has recommended a boycott of German scientific materials as a means of combating Nazi ideology.

German universities have lost over half their students in the last five years. The 116,154 students of 1932-33 have decreased to 53,753 in 1937-38, which is 53.7% loss, with greater percentage losses in engineering and the natural sciences.

University teaching staffs dropped 15.8% net in size in four years under Hitler, and it seems likely that about 1500 scientific workers in universities were deprived of their positions for political reasons. The University of Vienna in one year of German occupation lost 48.1% of its teaching staff as contrasted with 6% the preceding year.

"The German universities and research institutes have been so reorganized that they appear to be no longer so well adapted for the training of new investigators and for the promotion of current research," the report declares.

Wide-spread opinion among American scientists, checked by surveys of actual work produced, provide inductive evidence of a decline in German scientific output. Research as measured by pages published in German chemical, biochemical and physiological journals has fallen off 50% or more, while English and American journals either show no change or an increase. There has been a relative increase in foreign contributors to certain journals, so German contributions are less than page counts indicate.

With a few exceptions made for men of outstanding reputation, teaching and development of theoretical physics have been for all practical purposes forbidden, the report declares. Physics and mathematics journals have lost quality, and in the case of the international abstracting journal Zentralblatt fur Mathematik, political interference has caused resignations of its American and many other foreign editors. The two leading German sociological journals are now published in Paris and New York, and the famous philosophical journal Logos has become a propaganda instrument.

Science News Letter, July 15, 1939

GEOLOGY

Hollow Bullets Fired Down Take Oil Well Samples

See Front Cover

HOLLOW "bullets" fired deep underground from special 18-shot well guns are the newest feat of petroleum geologists to get exact information on the location of salt domes, oil-bearing sands and other formations which mark valuable oil resources.

The hollow bullets are fired into the side walls of drill holes and take samples which give final answers to information obtained by electrical prospecting.

The oil well "gun" stands higher than a man and has a diameter sufficient to permit it to enter a 5-inch bore hole. It is pictured on the front cover of this week's SCIENCE NEWS LETTER. Along its length are three sets of six "bullets" each. Any one of the 18 can be fired electrically from the surface of the ground.

When electrical prospecting indicates interesting variations in electrical resistance which may mark a transition from water-sand to oil bearing sand at say 6,900 feet, is is only necessary to lower the sample gun to that depth and quickly obtain a specimen of the geological formations at that point.

Core sampling, state E. G. Leonarson and D. C. McCann in a report to the American Institute of Mining and Metallurgical Engineers, can obtain similar information but taking continuous core samples is a costly procedure not always economical in well drilling.

The new method, state the experts of the Schlumberger Well Surveying Corp., permits rapid cheap drilling with the ability at any later date to go back and obtain samples at any given point beneath the surface.

The bullets in the sampling gun are fired by powder and project an empty metal cylinder into the side of the well to a depth of several inches. Because the cylinder is open at both ends it passes through the meaningless mud which may line the sides of the drill holes and enters the true geologic structures. Strong wires attached to the "bullets" pull them out. To prevent loss of the whole gun by breakage of its cable the wires for each bullet have a lower strength than has the cable. If a bullet becomes stuck its wires break off before the cable does.

About 70 per cent. return on samples is obtained, the experts report.

Science News Letter, July 15, 1939

ENTOMOLOGY

Fly Makes Mosquito Carry Its Eggs to Human Victims

MOSQUITOES have long stood convicted of the crimes of transmitting malaria, yellow fever and other diseases by their bites. That is a relatively simple and easily understood process. A much more complicated job, in which the real villain is a tropical botfly and the mosquito is a bullied and helpless accomplice, is described in the magazine *Natural History* by Dr. C. H. Curran, associate curator of insects at the American Museum of Natural History.

Botflies are insects that lay their eggs on the skin of animals. The emerging larvae burrow into the tissues, where they live as parasites, causing more or less discomfort and pain, until they are ready to emerge as adults.

This particular botfly, however, never visits its victims, which include monkeys and other mammals as well as human

beings. It has learned, somehow, a most fantastic and complicated method of making mosquitoes carry its eggs for it.

When a female of this species has eggs ready to deposit, she haunts a spot where mosquitoes are emerging from pupation. When a mosquito comes out, still soft-winged and unable to fly well, she grabs it and retires to a secluded and quiet nook. There, holding the victim carefully, she proceeds to lay from ten to fifty eggs, sticking them to the body and upper legs of the mosquito. Then she lets it go.

Later, the mosquito alights upon a human or simian victim, seeking its normal meal of blood. Immediately the larvae within the eggs burst forth and make haste to the victim's warm skin, which they presently penetrate, to begin the parasitic stage of their life cycle.

The same species of botfly, Dr. Curran states, also finds homes for its young in the bodies of cattle, but the indirect method of egg deposition is different in this case. The flies merely lay their eggs on the underside of leaves in the high bushes, and from these positions of vantage the larvae find their way to the backs and sides of cattle that brush through.

Science News Letter, July 15, 1939

ASTRONOMY

Star Emits Puffs of Smoke Causing Light to Vary

A STAR that periodically half-hides itself behind a puff of smoke, like an automobile with a dirty, soot-choked muffler, was described by John A. O'Keefe of Yerkes Observatory to the American Association for the Advancement of Science. This star, an inconspicuous member of the constellation Northern Crown, is a variable, that is, it undergoes periodic fluctuations in brightness.

Five years ago another astronomer, E. Loreta, suggested that the star produced its own dimmings by puffing out clouds of obscuring matter. Mr. O'Keefe's studies have now indicated that these clouds are probably composed of carbon dust—in effect, smoke.

The star apparently expels the carbon in the state of a vapor or gas, which speeds out to a distance of about four times the star's diameter and then condenses into solid particles.

Science News Letter, July 15, 1939

Unlike grasshoppers, Mormon crickets cannot fly in advancing on farm crops.

STUDYING DUST

The Navy Department is now getting ready to study the dust problem, cause of industrial diseases, on a larger scale. Assistant safety engineer Morris H. Mills is taking a dust photograph with this piece of apparatus which is designed to take samples of the dust content of the air and then to make a permanent record of the sample by photographing it on 35 mm. film. These film records can be studied and compared by enlarged projection on the Argus film viewer shown at the right.

PUBLIC HEALTH

North Dakota Health Program To Resume in Improved Form

Fixed Trial Period, Not Failure, Cause of Plan's Abandonment; Dues to be $33 Yearly

THE FARM SECURITY Administration's health program in North Dakota, far from being abandoned as a failure, as a recent news report indicated, is to continue under an improved plan shortly after July 30.

Dues will be set at $33 per year, a slight increase over the $2 per month of the last plan.

"There is no justification for saying the plan has failed," Jesse B. Yaukey stated. Mr. Yaukey, statistician borrowed from the U. S. Public Health Service, is second in command of this division of the FSA under the chief medical officer, Dr. R. C. Williams, of the U. S. Public Health Service.

The lapse in operation of the health program for FSA clients in North Dakota is similar to the lapse which occurred in 1937, Mr. Yaukey explained. It is due to the fact that the FSA and medical groups in North Dakota have deliberately limited each of the plans so far tried to a definite period for trial purposes, with the idea each time of starting operations again under new plans improved from the experience gained with previous ones. The last plan was set up to run for eight months ending June 30.

Dr. Williams and Mr. Yaukey will meet on July 30 with the medical group in North Dakota to put the final touches to the plans already made for the new program of health service. As soon as possible after that date, the new program, worked out at a meeting in May, will go into operation.

The new program, it is planned, will

operate for two or three years, instead of the shorter periods to which previous programs have been intentionally limited. Members may join at the beginning of each quarter-year. Under previous plans members were accepted only at the beginning of the program and for the entire length of its operation.

Dues will be increased slightly. They will be set at $33 per year, it is now planned. Under the last plan, the dues were $2 per month for each of the eight months of the plan.

Efforts will be made to bring the health program closer to the members, by community organization if necessary, in order to arouse in the members a feeling of responsibility for the plan which they have not heretofore shown.

Medical groups in North Dakota are eager to have the new program started and on a long-time basis. They point out that the present custom of operating the program for a limited time, stopping and starting it, is enough to make a program fail.

Science News Letter, July 15, 1939

GEOLOGY

Artificial Earthquake Reflections Show Oil

NEW prospecting methods may soon be needed in the great oil fields of the Texas-Louisiana Gulf Coast area. Like fishermen combing the sea for fish harder and harder to find, the oil prospectors have gone to increasingly finer "nets" to trap their sought-for oil deposits.

In the good old days exploratory wells were drilled, in geologically-typical formation, and often struck oil. Then came the core drilling methods which brought up to the surface samples of underground rock for examination and analysis.

Next, at least in the Gulf Coast region, reports E. DeGolyer to the American Petroleum Institute, came refraction seismology, which used dynamite blasts to set up sound waves in the earth's crust, and then studied their speeds of arrival several miles away.

In the salt dome oil region refraction seismology worked splendidly, for the waves travelled through salt at a speed of some 15,000 to 16,000 feet a second. In neighboring clays and rocks the speed was less than half that much. If the sound waves through the earth from the man-made earthquakes arrived at the receiving station much quicker than normal there was good chance that a hidden salt dome was in between. And in that region this usually meant oil.

Refraction seismology proved extremely successful in the seven short years it took to explore the Gulf Coast. For a cost of from $20,000,000 to $30,000,000 some 60 salt domes were located, or as many as previously had been known to exist in the region. The ability of this method, however, now seems to be exhausted, states Mr. DeGolyer.

The newest method is reflection seismology and oil prospectors are recombing the Gulf Coast with good success. What will come after this method no longer is practical, is unknown but it may be a form of soil gas analysis.

Despite the increasing difficulties of finding oil, the improvement of methods has actually lowered the "prospecting cost" hidden in each barrel of oil that goes to the consumer. In the early 1920's this ran as high as 25 cents a barrel. Today it is only 10 to 12 cents a barrel.

Science News Letter, July 15, 1939

ARCHAEOLOGY

Ten Years to Restore Mammoth Stone Circle

FOR CENTURIES, says a British archaeologist bluntly, the stone circle of Avebury has been "the outstanding archaeological disgrace of Britain."

But now, a ten-year campaign is underway to clean up Avebury and set the pattern of stones in place as nearly as possible the way prehistoric Britains left them.

Avebury rates special care, for it has been called the most impressive megalithic monument in the world. Far bigger than Stonehenge, the circle of ancient ceremonies encloses an area 1,130 feet in diameter.

Around the western rim, now, more than half the original stones stand erect. But back of that simple statement is a struggle of archaeologists to cope with three-foot heaps of broken bottles, tins and rusty pig wire; not to mention jungle growth, and derelict cottages, now at last removed.

Progress thus far is reported by Alexander Keiller of the Morven Institute of Archaeological Research, in the British journal *Antiquity*.

Mr. Keiller concludes that at first, in the early Bronze Age, three small circles of stones were ranged in a row at Avebury. Then, later in the Bronze Age, builders had a far grander idea and formed a huge circle. They ignored the earlier plan, if indeed they knew of it. This second Avebury is a ditch forming the mammoth circle, a bank outside that, and a single line of big stones inside it.

Some of these stones have been completely buried. Unearthing one, the archaeologists found a skeleton of a medieval workman, killed suddenly by accident while burying the stone. It happened in the fourteenth century, judging by two silver pennies of Edward I, minted at Canterbury in 1307, which had been in a pouch. The unfortunate man was a barber, for with him were his pointed scissors.

Avebury is now attracting thousands of visitors, and a museum has been opened to hold the accumulating evidence of its long story.

Science News Letter, July 15, 1939

ARCHAEOLOGY

Nestor's Palace of "Odyssey" Fame Unearthed

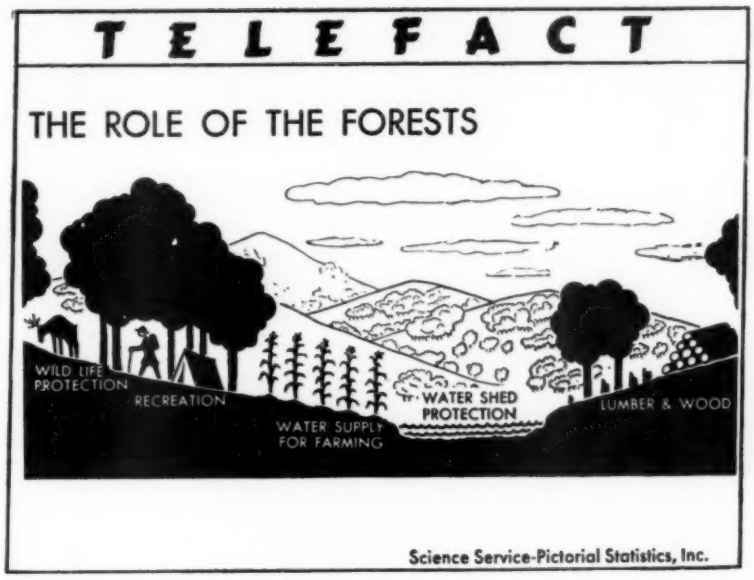
EXCITED over discovering ruins of Nestor's Palace, famed in Homer's "Odyssey," archaeologists are eagerly examining more than 600 Greek documents from the ruins, written in a baffling script.

The palace, identified almost certainly as the place where wise Prince Nestor entertained and advised young Telemachus in Homer's tale, has been found by the Ionian Sea on the promontory of Pylos.

Prof. Carl Blegen of the University of Cincinnati, noted for his discoveries at Troy, and Dr. K. Kourouniotis, director of the National Museum at Athens, are in charge of the excavations. The palace is revealed as a large residence, strongly built of stone with columns and fresco decorations.

Palace archives, stored in a small room, survived the fire that wrecked the ancient palace. Written on clay, they are in the mysterious kind of writing that was used by the brilliant civilizations of the Island of Crete. They prove that Greeks of the thirteenth century B. C. borrowed this script from Crete. Scholars can decipher only a few signs, but they recognize many of the archives as lists of men and goods, probably tax records.

Science News Letter, July 15, 1939



GEOGRAPHY

Soviet-Japanese War Theater Largest and Most Isolated

Bulk of Outer Mongolia Arena is Barren Desert Territory Only Thinly-Populated

JAPAN and Russia are engaged in border fighting and skirmishing, which may lead to a full-scale conflict, in the world's largest, most isolated and most forbidding arena of war.

For more than 2,000 miles stretch the borders between Manchoukuo and Inner Mongolia, on the Japanese-dominated side, and Siberia and Outer Mongolia, tacit ally of the Soviets. And there's hardly a mile of it which is easy for the outsider to reach, from Lake Baikal in the west almost to Vladivostok.

Right now the Soviets are depending on their autonomously-based Special Red Banner Far Eastern Army entirely during the current air and border fighting. If it came to war, supplies and munitions from Russia proper would undoubtedly be needed. They would have to come distances ranging from two thousand miles, if they are from the Ural industrial district, to as much as four or five thousand miles. Japan's supplies do not have to be brought as far, but they too will have upwards of a thousand and two thousand miles of travel behind them by the time they are brought into play. Japan's railroad system is superior in operation and in mileage to the Russian.

Outer Mongolia, where the bulk of the trouble is brewing at the moment, is principally thinly-populated desert territory whose southern part ranges into the far-famed Gobi Desert sitting across both Inner and Outer Mongolia. Inner Mongolia is a province gradually becoming more absorbed into the Japanese-dominated area of northern China, while Outer Mongolia is a republic dominated by the U.S.S.R. Only the grasslands in the northern part of Outer Mongolia, bordering on Siberia, are productive.

The Great Khingan mountains separate Outer Mongolia from the central plain of Manchoukuo and is one of the chain of mountains generally separating Russian from Japanese-controlled territory.

Main delineator of the Japanese-Soviet frontier is the Argun River, which becomes the famous Amur after it is joined by the Shilka. The Amur runs toward the East through a series of tilted land blocks whose steep sides face the Japanese, finally turning north near the point where Korea, Manchuria and Siberia come together.

Hundreds of miles inland for the most part, and unprotected in many places from the Arctic's freezing blasts coming down across the Siberian tundra, the climate is generally hot and dry in the summer, and bitterly cold in winter. Only the eastern portion of this huge Asiatic fighting theater has a moist and reasonably temperate climate.

The Japanese-dominated territory, except for the fertile central Manchurian plain, is far bleaker than the Soviet territory which, for all its forbidding character, has untold mineral, agricultural, forest and fishing wealth. Today Siberia is the scene of a boom reminiscent of America's own west half a century ago as cities spring up where tents were before and as factories, mines, stores, transportation systems and the other temples of industry are opened. As in our own west, Siberia's pioneering population is primarily young.

Little authentic or complete information is available as to the strength of the armed forces now in this vast area. But a year ago more than a million men faced each other across the Amur and the mountain chains to the east. Today that number, particularly on the Soviet side, is likely to have been increased. And the line of pillboxes, machine gun nests and other fortifications stretching from Lake Baikal to Vladivostok has unquestionably been strengthened not only to make life more difficult for Japanese attackers but also to strengthen the main Soviet railroad link, the Transsiberian Railroad, which runs for more than a thousand miles hard by the unfriendly frontier.

Science News Letter, July 15, 1939

●RADIO

Dr. Charles V. Akin, assistant surgeon general, U. S. Public Health Service, will be the guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Monday, July 24, 5:45 EDST, 4:45 EST, 3:45 CST, 2:45 MST, 1:45 PST. Listen in on your local station. Listen in each Monday.

Let us do it

If your bookdealer doesn't have that book you need, let us get it for you. Send check or money order to cover regular retail price ($5 if price is unknown, change to be returned) and we will obtain any American book or magazine in print and pay postage in the United States. When publications are free, send 10c for handling. Address:

Book Department
SCIENCE NEWS LETTER
2101 Constitution Ave. Washington, D. C.

ARCHAEOLOGY

Decentralization Is Old In American Economics

PREHISTORIC Americans tried the economic experiment of decentralization, when Indians in Colorado about 860 A. D. left compact villages for smaller and more livable communities.

This trend in ancient America is disclosed by Dr. Paul S. Martin, anthropologist of the Field Museum of Natural History. In a report of his excavations in Colorado, he states that after about a century of the freer life, Indians were again moving to town, and forming larger communities than before.

Dr. Martin traces the economic ups and downs in this area of early America to about 1150 A. D. when lack of preparedness caught the towns, which were built in the open, undefended. Marauding enemies, he believes, forced the Indians to flee to caves where they made their homes until a serious drought about 1276 A. D. caused their final evacuation of the region.

Science News Letter, July 15, 1939

PHYSICS

Power of Words Is Amazingly Small

IT MAY not surprise those who use words in attempts to influence people that the power of words is amazingly small. While the physicist has not in this instance entered into the realm of propaganda, Dr. J. O. Perrine of the Bell Telephone Laboratories has computed for Phi Beta Kappa's quarterly, The American Scholar, interesting figures upon the physical power of words:

"The average power of words is one one-thousandth of one-millionth of a horse-power. As power this ought perhaps to be measured not in horse-power but in gnat-power. But to analogize—if the heat power radiated from an ordinary Christmas candle could be properly distributed in minute amounts to speakers, in amounts proportionate to the 'power' of their words, 100,000 people could be kept continuously talking as long as the candle burned. Word power is almost the nadir of nothingness. When people whisper, the power of their voices is about one-hundredth of normal, when they talk loudly the power is 100 times greater and when they shout their words yet another 100 times more powerful. The tones of musical instruments vary widely in their horse-power. The pianissimo of a violin may be one one-thousandth of a whisper; the fortissimo of an orchestra may be 10,000,000 times more powerful than the violin. The consonant sound 'th' as in 'thin' is one one-thousandth as phonetically powerful as the vowel 'a' in the college cheer 'Rah.'

"Incandescent electric lamps in the home are rated in watts. A 10-watt lamp is generally regarded as one giving a small amount of light—perhaps that of a small Christmas-tree bulb. A 75-watt lamp gives a goodly amount of light and of course a sizable amount of heat. Kilowatt hydroelectric systems are still within the realm of reasonable power. The second power of a large symphony orchestra playing a great fortissimo, however, is 75 watts."

Science News Letter, July 15, 1939

ARCHAEOLOGY

Find Early Rolling Pin In Armageddon Ruins

IN THE ruins of Armageddon, famed for its battles, an American archaeologist has unearthed what he believes to be a "protective instrument" belonging to a woman of the house. This early forerunner of the rolling pin of comic strip fame is described as a delicately carved ivory wand, half moon shaped, over nine inches long.

The wand, which is so remarkable a find that the Palestine Museum has claimed it for exhibition, was unearthed on the last day of digging this season, by the Oriental Institute of the University of Chicago, at Megiddo — Biblical Armageddon. The field director, Dr. Gordon Loud, who has just returned, said that the piece is the first of its kind ever unearthed in Palestine, although such ivories were known in Egypt about 1900 B. C.

The ivory wand was found in the 1400 B. C. layer of ruins at Armageddon, he explained, but it apparently was a family heirloom for about 500 years. The carvings indicate its ownership by a woman and its probable protective use.

Buildings unique in Palestine exploration have been cleared by the expedition. They are temple-like structures, similar to buildings found in Syria and reported in the annals of ancient Assyria. But these are apparently 500 years older than such buildings elsewhere, and Dr. Loud is mystified as to where Palestine builders got the idea. At the rear, the archaeologists found to their surprise what appears to be an outdoor sacrificial altar—judging by whitened bones nearby—not connected by any passage with the temple.

Science News Letter, July 15, 1939

IN SCIENCE

CHEMISTRY—AERONAUTICS

Try Nylon, for Parachutes, Glass for 'Chute Harness

AVIATION'S future Caterpillar Club members, men who have saved their lives by means of the parachute, may owe their escapes to a machine instead of the caterpillar that secretes the silk needed until now for the big umbrellas.

Uncle Sam's national defense experts are now trying 'chutes made from the new synthetic silk, nylon, which will appear in a few months' time in sheerer, stronger and more supple stockings and which is made from coal, air and water.

Parachutes from a new, lighter grade of mercerized cotton — cotton treated with caustic soda—are also being investigated by the Army Air Corps. Sample 'chutes of both materials have been ordered from private contractors. If either or both are successful, U. S. dependence upon the Japanese silkworm for a vital military material will be lessened.

Ordnance officers are also watching closely the possibility of making ammunition bags, at present made of real silk, from nylon, Army officers said. Sufficient quantities of nylon are not yet available, however, to warrant immediate tests. In the case of the ammunition bags, the chief requirement of the fabric, which silk fulfills, is that it burn completely and not leave any smoldering fragments in the gun breech. Otherwise a disaster would result when the next shell and charge were placed in the gun. The bags are used to contain the explosive charge that starts the shell on its way.

A strong, tough fabric made from glass fibers is also being studied for parachute harnesses. Glass fibers cannot be woven tightly enough for use in the 'chute itself, but it looks like a highly desirable material for the harness webbing, another officer declared. Nylon is also being studied for harnesses.

Chief requirements of a parachute material are a high strength-to-weight ratio (it must be strong and light), durability, ability to take a tight weave and resistance to moisture. Nylon's makers claim it meets these to a marked degree.

Science News Letter, July 15, 1939

E FIELDS

CHEMISTRY

Uncle Sam's Rubber Will Keep 25 Years

BY the proper inspection of the crude rubber which the United States will exchange with Great Britain for cotton under the new trade agreement just signed, Uncle Sam need have no fears that he is exchanging a permanent commodity for one which rapidly deteriorates.

Dr. A. T. MacPherson of the National Bureau of Standards says that properly selected crude rubber, properly stored, will last 25 years without suffering a decrease of its valuable properties.

The two dangers in rubber are the elements copper and manganese which quickly make rubber become soft, sticky and virtually worthless. The manganese may come from the water and soil of a rubber plantation, while copper and brass may appear in the equipment of the plantation.

By proper standards for the rubber it receives by the exchange agreement, the United States can easily overcome these potential hazards. Storage in a dark, cool warehouse will be all that will be necessary.

Science News Letter, July 15, 1939

ARCHAEOLOGY

Tree Rings Tell Age Of Viking Ruins

THE AMERICAN idea of making tree-rings tell the age of Indian pueblos is now used to reveal Viking dates.

One famous Viking mound 60 feet high, in southern Norway, is believed to have been constructed in 931 A. D. By tree-ring evidence, Norsemen chopped trees to build a wooden burial chamber here and cover it with earth in 931.

The impressive burial mound is one of Norway's mysteries, for when it was probed in 1868 only wooden wreckage and remains of a horse were found.

Ebba de Geer, a leading investigator of the possibilities of dating Scandinavian ruins by tree-rings, is dating ruins like this by aid of California's venerable Sequoia trees and clay varves from northern Sweden.

The Sequoias offer a long record of growth rings. The alternate light and dark layers, or varves, of clay deposited in the wake of retreating glaciers also mark time for long eras. Miss de Geer puts together three-way evidence and gets her Scandinavian dates.

A Swedish fort in Gotland is a pre-Viking ruin dated by aid of Sequoia rings. It was built in the fifth century A.D.

Roundabout methods are used because no complete tree-ring calendar has been made using northern Europe's own trees. The principle of such a calendar is to start with the pattern of rings in a freshly cut tree, then match and overlap series of rings in older and older timber fragments until an unbroken record for centuries is formed. Since each growth ring has its assigned calendar year, timber of the same kind and region can be matched to the tree-ring calendar to learn its age.

Rainfall causes Arizona pines to form wide or narrow rings in good or bad growing years. In Scandinavia, growth records are apparently affected more by temperature, and other solar radiation effects, which accounts for the Sequoias proving a help in dating.

Science News Letter, July 15, 1939

RADIO

New Television Tube Improves Detail of Image

A NEW television pick-up tube which improves the detail of the image sent out over the radio waves by ending "splashing" of electrons has been developed by Radio Corporation of America engineers, Harley A. Iams and Albert Rose of the RCA Laboratories at Harrison, N. J., told the Institute of Radio Engineers.

In much the same fashion as the stream of water from a garden hose played against a garage door splashes and wets neighboring portions of the door, the stream of electrons played upon the photoelectric cell mosaic which picks up the image to be broadcast splashes into neighboring parts of the mosaic and interferes with a properly detailed image, the two engineers explained.

But now a means of controlling the electron stream so that it has just enough force to hit the mosaic without splashing has been worked out, they said. Hence there is no interference with neighboring portions of the mosaic and greater detail is provided.

Science News Letter, July 15, 1939

PSYCHOLOGY

Things Are Seen as They Are Not as They Appear to Eye

CAMERA enthusiasts are shocked during their learning days by the difference between what the camera sees and what they see.

The finished picture contains many surprises. Backgrounds pop up where none were noticed. Trees seem to sprout from the best girl's shoulder. Dainty hands have become enormous in the foreground. Stately elms are suddenly dwarfed by the towering figure of a three-year-old who has run uninvited into the picture.

Psychologists are not surprised that we fail to see these things that the camera picks up. Instead, they marvel that the human brain is able to ignore the images on the retina of the eye and see only objects as they actually are, making complicated corrections for distance, color of light, and point of view.

The value for practical purposes of this ability of the human to register directly in terms of objective facts rather than in terms of the wave frequencies received by the senses was stressed by the psychologist Dr. Robert S. Woodworth of Columbia University in a recent address before Sigma Xi.

You may not even understand the cues received by your senses, yet you can interpret them correctly. Physicists know, Dr. Woodworth pointed out, that a violin and saxophone differ in their overtones. The listener can scarcely identify these overtones, except after special training, but he can use them to distinguish the instruments.

In the open air where echos do not confuse, a blindfolded person asked to face toward the source of a sound does so with an error of only a few degrees. He is able to do this because the sound reaches one ear a minute fraction of time sooner than it reaches the other or because the intensity varies almost imperceptibly in his two ears. Yet he is completely unaware of these cues.

Even mind-reading is possible to a certain extent, Dr. Woodworth said, by means of such elusive cues from face, voice, gestures or expressive body movements. But you must beware, he warned, because "the human being is not a perfectly unbiased registering instrument.

"His own preferences and prejudices often prevent him from seeing the truth where the truth is really very well revealed."

Science News Letter, July 15, 1939

PSYCHOLOGY

To Swing Off to War

Sentimental Songs Will No Longer Bring Enlistments Say Experts, Citing Rise of New Demands in Tempo

By EMILY C. DAVIS

AMERICAN doughboys may march to the next war to swing music—if America is drawn into fighting any time soon.

No more "Tipperary." No sentimental "Long, Long Trail."

With swing, the soldiers come down the street keeping time to drumming. "Feverish, voodoo drumming" such music has been called. Then the band breaks into a tune. It's a swing polka. Saxophones take it and the military tramp matches the nervous, excited rhythm of the horns. Then, the band "throws the trumpets out the window" and the whole formation is swung into high thrill by that brassy climax.

Swung off to war! But why?

The answer is: Because it will take more sophisticated and streamlined music to get enlistments for another war.

Authority for this forecast is the Institute for Propaganda Analysis with headquarters in New York. The Institute doubts that tear-jerker songs will arouse any enthusiasm in the Veterans of Future Wars. The VFWs cherish no rosy illusions of war's glories.

Analyzing propaganda, to teach Americans how to become a nation of critical thinkers, is the mission in life of the Institute. It has worked with 350 high school classes, also adult groups in colleges, and farm, civic, and professional organizations.

Definitions

And if you are mentally casting about for a neat two-word definition of propganda, just to fix in mind what the thing is, probably that's a waste of time. The Institute has a collection of definitions. Most of them sound as if a corporation lawyer drew them up. Propaganda may be good. It may be bad. That depends on its use. Either way, it's an effort to get across information or ideas to people, in hope of influencing them.

Martial music is a good example of how rhythms can influence people. The tramp, tramp song wasn't put into warfare when the American Revolution started. If it had, George Washington's task might have been easier, the Institute points out. That rhythm gets into the blood, inspiring volunteers.

Professional soldiering was the usual thing in the eighteenth century. "Yankee Doodle" was a simple, playful march —and it still is. It's the military rhythm that you hear on the stage, when the stalwart troopers march by and the pretty girls wave. It's tin soldier music, nowadays.

But revolutionists discovered what bugles could do, with the "to arms" or "arise" cry put into bugling. Result was the French "Marseillaise" and the American "Star-Spangled Banner."

The bugle call effect in George M. Cohan's "Over There" is credited by the Institute with helping win the World War.

All styles of military meter were tried in the World War, including dance rhythms that appealed to our Spanish War era.

Marches Still Swingless

The U. S. Army Band is still playing its Sousa marches straight—not swung—and disclaims any attempt to try swinging military march tunes. Musical preparedness is mostly of the technical variety. It would be hard to invent and practise music of the right psychology for vaguely future "emergencies."

The music in speech is playing a big role in international affairs swaying nations, the Institute points out. Never before in human history has the musical art of speech been so cultivated by those in power, declares the organization's educational director, Violet Edwards, in a new publication.

Dictators issue personal orders to millions of subjects. Even speeches that turn into blah when analyzed, may carry the crowd by their eloquence, and accomplish their purpose, she points out. Obviously, in these cases the voice does something that print could not achieve.

"The microphone," says Miss Edwards, "came too late for Woodrow Wilson, who stood mute and helpless before milling throngs of people who could only get his arguments for the League of Nations by reading the papers."

She would like to see the power that lies in words and music investigated in joint research by musicians, actors, speakers, dramatists, psychologists and sociologists.

"The time is ripe," she urges "for a needed study of these arts by which war psychology and extreme nationalism have been fostered since the French Revolution."

She also recommends that Americans get a better idea of forces that mold our society today by scrutinizing history and literature to see how people have been influenced in the past. The Boston Tea Party was action propaganda, in an American time of stress. Shakespeare's Macbeth and his ambitious wife were maladjusted people, fighting frustration. Their drama shows what people would fight for, and kill for, in those days.

When modern Americans idealize movie stars and athletes, they are drawn toward something that means to them conquest of fear. At least that's the way the situation is seen by Miss Edwards. Ideals are often fears in reverse, she concludes. Medieval Anglo-Saxons were inspired by the traditional hero Beowulf, because, just like the successful actor or ball player, Beowulf outwitted special insecurities of his time. Today that means making money, having a glamor career. With Beowulf it was slaying wild beasts and tossing off physical hazards with super courage and efficiency.

Powerful Appeals

With average Americans today, the appeals that are apt to carry the most influence are mainly these, it has been figured out. And you'll notice in the list emotional desires that influence a good many people you know, whether or not you think you are susceptible yourself:

To be popular.

To be with the crowd.

To get as much as possible for as little effort as possible. The scientific term for that is efficiency.

To get as much as possible for as little money as possible. Economy, in short.

Luxury, sex, appetite, curiosity—these round out the list of outstanding desires.

But there's a negative side, too; a string of fears that strike home to the average human. Major fears include:

Fear of being poor.

Fear of being ugly.

Fear of being neglected, or left out of the crowd.

TEMPO

Soldiers' marching feet went off to the last war to such sentimental tunes as "There's a Long, Long Trail," but the next war in which America may be involved will need a new type of rhythm. In the beating feet of current jitterbug dances (top) and the music that makes them click experts see potentially America's wartime music of the future.

Fear of social disapproval.

And if you'd like to know what the seven common devices are for appealing to these almost sure-fire fears and desires, here's the list:

Name calling; using glittering generalities; suggesting by transfer that you can be like some admired person; testimonials; the plain folks line; card stacking; and the appeal to jump on the band wagon.

With life as complicated as it is today, and millions of people trying to run a democracy, there's no escaping propaganda, so the Institute concludes. The thing to do, as they see it, is to avoid being gullible. That means becoming a nation of critical thinkers, who make decisions after scrutinizing what we read, hear, or are told. They'd like propaganda analysis to become an American habit.

Science News Letter, July 15, 1939

CHEMISTRY

Natural Gas Yields New Family of Useful Chemicals

NOT often does chemistry present industry with a whole new assortment of chemicals, capable of extensive use in various fields, although single new chemical compounds, undreamed of in nature, are frequently produced. That is the reason chemists are somewhat excited by the development of the nitroparaffins by Commercial Solvents Corporation research. For they constitute a whole group of chemical compounds entirely different from any which have been available before.

The basic raw material for the manufacture of the new chemicals is natural gas, large quantities of which are being wasted daily. Methane, ethane, propane and other principal constituents of natural gas have been very difficult to entice into chemical combination. In fact they have been called the paraffins (par-affin meaning "no affinity") because of their inertness. What we commonly know as paraffin, the solid wax petroleum, is of the same chemical family.

Successful nitration of these gases by a new technique has produced nitromethane, nitroethane and four other similar compounds. They are colorless, mild-odored, heavy liquids which boil at slightly higher temperatures than water's boiling point. From these nitroparaffins a variety of chemicals are being made, while the new chemicals themselves are also proving useful.

A new explosive that may rival TNT can be made from nitromethane, by reacting it with formaldehyde to form a nitrotrialcohol, which can be nitrated. This possibility first brought the nitroparaffins to public attention.

The nitroparaffins are direct and active solvents for nitrocellulose and for a wide range of synthetic and natural resins as well as for fats and some dyes. Mixed with alcohols, they are solvents for commercial cellulose acetates. Nitroethane is a heat sensitizer which brings about the gelling of rubber latex, while chlorinated nitroparaffins are anti-gelling agents, useful in rubber cements.

Market surveys indicate, according to Arthur D. Little, Inc., that ammonia derivatives of nitroparaffins may command markets in many industries for use in manufacture of synthetic organic chemicals.

Science News Letter, July 15, 1939

MEDICINE

New X-Ray Procedure Helps Fight Tuberculosis

A NEW X-ray procedure which promises to help in the fight on tuberculosis was described by Drs. Israel Steinberg, George P. Robb and Ursula J. Roche, of New York City, at the meeting of the National Tuberculosis Association in Boston.

The new method may enable doctors to determine the effect of lung collapse therapy, one of the new methods of treating tuberculosis, on the physiology of blood circulation in the lungs, and even to evaluate effectiveness of this treatment.

"It seems certain," the inventors of the method said, "that many problems in pulmonary disease which previously have been studied only in animals or in autopsy material may now be investigated during life."

The new procedure consists of injecting a concentrated solution of diodrast rapidly into the veins. This substance makes the veins opaque so they can be seen in the X-ray picture. Within a matter of seconds, the heart and the veins and arteries of lungs and chest of a normal person can be seen by this procedure.

Striking decreases in the number of veins carrying blood away from the involved areas of the lungs were found to be characteristic of pulmonary tuberculosis. Other changes in the lung arteries were seen.

Science News Letter, July 15, 1939

An electric eel at the New York World's Fair zoological exhibit is capable of electrocuting a man, and attendants handle it with rubber gloves.

METEOROLOGY

Hot Summer Ahead, Is Indication of Warm Spring

JULY and August are going to be warmer than average, if this summer's weather follows the pattern determined by many years of observation, states Charles D. Reed, senior meteorologist of the U. S. Weather Bureau at Des Moines. Mr. Reed bases his long-range forecast on the high-temperature record established for May and June.

May was an especially warm month over the country's great crop areas generally, with a "plus departure" of about six degrees for the month in Iowa. June has shown about two degrees in excess of normal. When May and June temperatures together are that much above normal they are practically invariably followed by a hot summer, long-time statistical studies have shown.

Mr. Reed's figures and forecasts are based primarily on Iowa conditions, and apply with decreasing pertinence over widening zones away from that midland center.

Based on the general temperature forecast is a second forecast by Mr. Reed, that not more than five per cent of Iowa's great corn crop will be caught by frost next fall. Over a fifteen-year period, the average amount of frosted corn comes to 15 per cent of the total crop, so that the expected 95 per cent of the frost-free corn for this year will represent a very considerable gain.

The most uncertain quantity involved in this crop forecast is the question whether the excess temperatures to come during the next two months will be high enough to harm the corn. A let-up in the rains is normally to be expected after the end of June, but shortage of moisture alone is less damaging to corn than too high temperatures even when there is a moderate amount of moisture remaining in the soil.

Fears aroused by a dry May that the summer of 1939 would be another disastrous drought season have been well dissipated by a June that brought abundant rainfall. By contrast with its arid predecessor, June has seemed an excessively wet month, but official figures show only a slight to moderate excess in precipitation for the month. However, soil moisture is mostly in normal condition, so that crops are in relatively good situation for the long pull through the hot-weather weeks ahead.

Science News Letter, July 15, 1939

PSYCHOLOGY

Chart Shows Chances That Prisoner Will Make Good

CRIMINAL Court judges may some day be provided with "Prediction Charts" that will aid in pronouncing wise sentences, in the same way that actuarial charts enable life insurance officials to figure the "risk" on applicants.

A judge could use such a chart to figure just how good a risk any particular offender would be on probation, under suspended sentence, or in reformatory, jail or prison.

If You Are Interested in Better Health and Longer Life Read
TROUBLES WE DON'T TALK ABOUT
By Dr. Joseph Franklin Montague
Well Known New York Intestinal Specialist
$1 Cloth, 142 Pages Illustrated
● COLITIS ● CONSTIPATION AND MANY OTHER AILMENTS
The HOME HEALTH LIBRARY, Inc. 516-5th Ave. New York City

This suggestion is more than a fanciful dream of Utopian justice. It comes as the result of years of research from Dr. Eleanor T. Glueck, of Harvard Law School, student with her husband of hundreds of criminal careers.

Time has a strong reforming influence. Older criminals settle down or actually reform unless some mental condition prevents their maturing. The FBI removes records from the active file when the criminals reach "retirement age."

Scientific treatment of the criminal, therefore, should do everything possible to hasten the natural process of maturing. Educators, psychologists, and psychiatrists, and sometimes physicians can aid in this endeavor.

But mental and character growth is an individual matter and what is one man's meat is another's poison in the matter of confinement and discipline or freedom and responsibility.

To cite an actual case, Dr. Glueck gives the chart figures for Martin. Martin was fifteen when he came before a judge. His chances of making good before the age of 30 were good—6 out of 10. His chances under probation would be 4, under suspended sentence 6, on parole 6.5, in correctional school only 4.5, in reformatory 3.5, but in prison, jail or the Army or Navy 7.

Under the present haphazard system of disposing of offenders, Martin was placed on a straight probation. He ran away. Then he went to a correctional school, where he was very difficult to handle. When paroled at the age of 17 he did well for 4 years and then again was placed on straight probation.

Again he defaulted but this time he joined the Army where he did exceedingly well. Since his discharge Martin has been no trouble at all.

The chart, based on Martin's history and characteristics, would have provided a scientific short-cut to this end.

Science News Letter, July 15, 1939

ASTRONOMY

Brooks' Periodic Comet Back to Region of Earth

BROOK'S periodic comet—first found in 1889 and which has returned every seven years since that time—returned within the range of telescopes of American astronomers, according to Dr. Harlow Shapley of Harvard College Observatory, American center for the distribution of astronomical information.

Of the 17th magnitude, Brooks' comet was much too faint to be seen with the unaided eye. It was spotted on photographs taken at Lick Observatory, Mt. Hamilton, Calif., by Dr. H. M. Jeffers and Miss Adams Wright.

Date of the discovery was June 17, at which time it was a diffuse object with nothing reported about its tail. Time of the discovery was 10 hours 52.6 minutes Greenwich civil time.

Its position on that date was right ascension zero hours, 7 minutes and 41.5 seconds and declination plus three degrees, 29 minutes and 20 seconds.

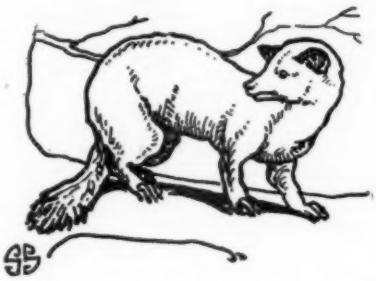
This position places the comet about 10 degrees south of the star known as gamma Pegasi near the constellation of Pisces. It passes the meridian line at 6 o'clock in the morning.

Science News Letter, July 15, 1939

Lake Mead, Boulder Dam's 115-mile reservoir, is still filling.

ZOOLOGY

NATURE RAMBLINGS
by Frank Thone



Changing Coats

SUMMER furs are commonly thought of as synonymous with feminine vanity: the animals that actually produce those furs sensibly wait until frosty weather before putting on their winter coats.

Yet a number of mink have been induced to change to winter-weight fur in the hot days of late summer, weeks ahead of their normal time, not by putting them in a cold place but by cutting down the number of hours of light in their day. Prof. Thomas Hume Bissonnette of Trinity College, Hartford, Conn., conducted the experiments.

In the experiment he had the collaboration of Everett Wilson, owner of a mink ranch at Somers, Conn. The two men put 16 minks in cages in a cellar, where the sole source of light was a window fitted with light-tight shutters. These were used to make each day artificially a little shorter than the day before, as becomes noticeable in nature with the coming of autumn. Fifty animals were kept outdoors under normal conditions, as controls.

The controls changed from summer to winter fur at the normal time, in October and November. Not all the experimental animals responded to the change in lighting, but six of them very definitely did. They had shed their summer fur and assumed winter coats before Sept. 18. One of them, a female, had made the change by Aug. 17, the hottest part of the summer. Other animals showed less complete coat changes, and some practically none at all.

Prof. Bissonnette states, in conclusion: "It is indicated that the assumption of winter prime pelt by mink may be induced in summer in spite of relatively high temperatures or hastened in autumn by reducing the duration of the periods of light (and/or its intensity) to which the animals are exposed daily. Reduced temperature is, apparently, at most, a minor factor in this reaction."

Science News Letter, July 15, 1939

PSYCHOLOGY

Mood Aroused by Music Is Linked With Color "Seen"

FIGURES of speech abound in mixtures of sensory experience—we speak of "hot music," "Blue songs," "loud suits," "tone pictures," "soft tones," "sweet melodies," and "dark brown tastes."

To some, these have more than figurative significance. The association of color and music seem particularly real to some who feel that a musical selection can actually be seen as a color or series or mixture of flowing tints.

Exploring this odd linking of the senses, Drs. Henry S. Odbert, Theodore F. Karwoski and A. B. Eckerson, of Dartmouth College, found that the mood evoked by a musical selection is related to the colors "seen" or associated with that particular composition.

The *Market Place,* from the Ravel transcription of Moussorgski's *Pictures in an Exhibition* was described by listeners as predominantly merry, agitated, or humorous. More than half the colors reported were light mixtures, reds and yellow.

The *Giant Motif* from Wagner's *Ring Cycle,* called vigorous, serious and sad is "seen" as black, purple or as color mixtures.

The Delius composition *On Hearing the First Cuckoo in Spring,* which arouses a mood dreamy and serene generally brought to mind light mixtures of colors, blues and greens.

Very different are the colors "seen" or thought of in connection with Wagner's *Rienzi Overture.* This vigorous, exciting composition makes the listener see red.

The Fafnir Motif from the Ring is very predominantly called doleful or gloomy, and the colors are also predominantly black.

Compositions suggesting many different moods to different listeners receive also many scattering color associations or reports only of mixtures.

Red, and orange, it was found, are generally passionate and exciting, pink is serene, yellow is humorous and gay, green and blue are dreamy, purple majestic, brown doleful, white spiritual, and black tragic.

Science News Letter, July 15, 1939

AERONAUTICS

Army Tries Four-Bladed Propeller For Planes

A U. S. Army Air Corps P-36 pursuit plane has been fitted with the first controllable pitch four-bladed propeller ever tried in the United States, engineers at the Air Corps' testing laboratories announced, in a study to find the propellers to go with giant airplane engines now under construction by leading manufacturers.

Performance of the radically new type of propeller will be compared with that of another unusual arrangement the Air Corps has been trying for more than a year: two "props" mounted in tandem on the same shaft and rotating in opposite directions, the Air Corps said.

As engines grow more powerful, larger and larger propellers of standard type have to be used. Unfortunately, engineers are finding several limitations to increasing the size of the present three-bladed propeller. In order to keep the speed of the blade tips below the speed of sound, the propeller must be turned over more slowly. In addition, small pursuit-type ships would require unwieldy landing gears in order to give the huge propellers proper clearance of the ground. Another objection to the continued growth of propeller diameters is the increase in weight of each blade.

A Curtiss electrical hub controls the four duralumin blades of the new propeller. Theory of the addition of blades, engineers explained, is that it increases the solidity ratio of the propeller for a given propeller diameter, thus giving more efficient operation for given power and diameter, especially at high altitudes. Propellers using even more than four blades are not considered an impossible development of the next few years. No comment on results of tests thus far conducted on the four-bladed propeller is available yet.

Science News Letter, July 15, 1939

UNUSUAL SCIENTIFIC DISCOVERIES

EASY EXPERIMENTS

Details on Soilless Gardening—Colchicine the chemical creator of huge new plants and giant flowers—Cure for near-sightedness—Growth Hormones — Sex hormone rejuvenators — Electric treasure finder—The unexplainable N'Goureyma meteor—etc.—are in Quest booklet No. 1. Special introductory offer, 5 issues $1.00 (send your check or dollar bill) sample copy 25c. Address Quest B-2, Wellesley, Mass.

INVENTION

Patent Control of Flight And Fueling of Rockets

New Patents Describe Aids to Rocket Flight; Advances in Cakes and Nylon

THREE patents on flight control and fueling of rockets were issued by the U. S. Patent Office to Prof. Robert H. Goddard, on leave from Clark University, who for years has been experimenting with rockets upon an isolated proving ground at Roswell, N. M. In all, 943 patents were issued.

Twin gyroscopes placed in the rocket to guide it in flight and automatically keep it on a predetermined course are covered in patent No. 2,158,180. This device can also be applied to an airplane to make it return to a course from which it may have shifted.

Another Goddard patent describes a delayed action reversing switch, operating in conjunction with gyroscopes which will make current flow through an electrical circuit one way and then reverse it after a properly determined time. His third patent relates to a heat insulating coupling to be used on a pump which pumps liquid air, a common rocket fuel.

Better Cakes

To Benjamin R. Harris of Chicago, Ill., goes patent No. 2,158,775 for a superior cake batter and shortening for making better cakes.

Assigned to the Proctor and Gamble Company, the invention claims to produce cakes which do not shrink when removed from the oven, and which have a better texture.

Grandmother would be surprised at one of the ingredients in one of the Harris cake recipes. It is oleostearine sulphate, which the patent claims improves the cake.

New Nylon Patent

An additional patent on nylon—the synthetic organic material which can be used in fibers rivalling those of natural silk—has been granted posthumously to Dr. W. H. Carothers, chemist of the E. I. du Pont de Nemours and Company. The new patent, No. 2,158,064, covers the application of variations of nylon to the coating of fabrics already existing and also its potential use as a lacquer.

Light Polarizer

To Edwin H. Land of Boston, Mass., went another new patent, No. 2,158,130, for his polaroid material which improves its value for use in automobile headlights to eliminate glare.

Photographic Sensitizers

Patents Nos. 2,158,882-3 were granted to Dr. C. E. K. Mees, director of research of the Eastman Kodak Company, for new types of specially sensitized photographic emulsions containing cyanine dyes that makes them sensitive to the red region of the light spectrum.

Science News Letter, July 15, 1939

OCEANOGRAPHY

Germany's Hope of Food From Sea Is Impractical

GERMANY'S hope of harvesting tiny marine plankton from the sea for their food content, is doomed to economic failure, it appears from studies on collecting these organisms already on file at the Woods Hole Oceanographic Institution.

German scientists have reported that the larger kind, known as zooplankton, have a nutritive value equal to the best meat and the smaller phytoplankton have a food value equal to rye flour.

There is little quarrel about the food value, reports Dr. George L. Clarke of Woods Hole. (*Science,* June 30.) A typical catch of zooplankton when dried shows 7 per cent fat, 59 per cent protein, 20 per cent carbohydrate, and 14 per cent chitin and ash.

Sharks, whales and other kinds of fish feed on plankton almost exclusively so that the nutritive value is demonstrated. Moreover, shipwrecked crews have been known to sustain themselves on plankton strained from the sea with handkerchiefs.

However, explains Dr. Clarke, it is virtually impossible to get enough plankton to consider it a commercial food source. Knowing the size, mesh and towing speeds of nets fine enough to gather them, it can be shown that it would take two and a half hours to catch enough plankton to feed a single man for one day.

It would be necessary, moreover, to strain them out of a volume of seawater equal in size to a football field and about a yard deep, or about 7,500 cubic meters of water.

The problem of catching enough plankton seems to have comparable handicaps with that of getting gold out of the sea. There is plenty of gold—and plankton—in the ocean but the economics of filtering and treating enough water to get them out takes the problem from the realm of practical reality into one of academic interest only.

Science News Letter, July 15, 1939

SCIENCE NEWS LETTER SUBSCRIPTION COUPON

To Science News Letter, 2101 Constitution Avenue, Washington, D. C.

☐ Start ☐ Renew my subscription to SCIENCE NEWS LETTER for ☐ 1 year, $5 ☐ 2 years, $7

Name_____

Street Address_____

City and State_____

(No extra postage to anywhere in the world)

•First Glances at New Books

Additional Reviews On Page 48

Geography

I WENT TO THE SOVIET ARCTIC—Ruth Gruber—*Simon and Schuster,* 333 p., $3. A newspaper woman's assignment to find out what is happening in the northern Soviet country results in this personal experience volume, easy to read, full of the drama of new Russian experiments. Dr. Gruber, a young university Ph.D., author of a critical literary volume, combined with this background a knowledge of Russian and friendliness for people. Her book gives a favorable impression of the lives of the Soviet Arctic's women —with whom she was particularly concerned.

Science News Letter, July 15, 1939

Anthropology

PUEBLO INDIAN RELIGION—Elsie Clews Parsons—*Univ. of Chicago Press,* 2 volumes, 1275 p., $7. Dr. Parsons is well known for her Indian studies, which always delve into the heart and reason of what she sees. In these thick volumes, she tells us that religion is Life to the Pueblo Indian. If we understand his animistic beliefs and their influence on behavior, we shall come close to understanding Southwestern patterns of living. The study discusses all but four Pueblo tribes, and draws parallels also with surrounding Indian cultures.

Science News Letter, July 15, 1939

Education

HISTORY OF EDUCATION CHART—Lester B. Sands and John C. Almack—*Stanford Univ. Press,* $1. One of those fascinating history-by-the-yard devices that unfold, and set the reader following green lines and blue lines to find out what happened when. It starts with the Homeric period and ends now.

Science News Letter, July 15, 1939

Archaeology

THE MAKING OF EGYPT — Flinders Petrie — *Macmillan,* 187 p., 82 plates, $3.75. Prof. Petrie has produced an unusual book in this history of Egypt told in terms of significant advances and changes. He tells the story with numerous illustrated objects, largely from his own excavations, and comments on their meaning for Egyptian history from the Stone Age to the Ptolemies.

Science News Letter, July 15, 1939

Medicine—Geography

WE DIDN'T ASK UTOPIA—Harry and Rebecca Timbres—*Prentice-Hall,* 290 p., $2.50. This book contains so much excitement, drama and heroism that it is worth reading for its entertainment value alone. It is a modern adventure story, but it is much more because of the remarkable inside view it gives of life in Soviet Russia. The book consists of the personal letters and journal which tell the experiences of an American family who lived and worked, Russian-style, in a small mill town on the Volga. Not only conditions but people are vividly described, so that the reader feels he knows Annushka, Julie, Polya and the Timbres' other Soviet friends, and through knowing them comes to understand better their country and their ideals.

Science News Letter, July 15, 1939

Geology

A SOURCE BOOK IN GEOLOGY—Kirtley F. Mather and Shirley L. Mason—*McGraw-Hill,* 702 p., $5. A companion to source books already published in astronomy, mathematics, physics and geology, this volume tells in the words of the pioneers themselves the story of the earth and its ancient rocks and life up to the beginning of our century. The ubiquitous da Vinci leads the procession of some 125 scientists whose works are included. The most entertainingly and expertly written books about geology must fail to give the peculiar flavor of the discoverers who write perforce plainly because what they are telling has not been told before.

Science News Letter, July 15, 1939

Agriculture

GROWING PLANTS WITHOUT SOIL—D. R. Matlin—*Chemical Pub. Co.,* 137 p., $2. Despite rather numerous inaccuracies, this book can be used to advantage by persons interested in growing plants in solution culture, particularly by students in high school and beginning college classes. It contains a good deal of tabulated information not found in other books on this subject.

Science News Letter, July 15, 1939

Geography

THE LAKE OF THE ROYAL CROCODILES —Eileen Bigland — *Macmillan,* 299 p., $2.50. A diverting travel book, full of incidents and dialog brightly told. Voyaging by flyingboat from Southampton to Africa, the author carries the reader into the heart of the Bemba kingdom. Light though the book is, it provides a clearer picture of modern African travel and the interesting people met there, than some more weighty tomes.

Science News Letter, July 15, 1939

Archaeology

SO LIVE THE WORKS OF MEN. SEVENTIETH ANNIVERSARY VOLUME HONORING EDGAR LEE HEWETT—Donald D. Brand and Fred E. Harvey, eds.—*Univ. of New Mexico Press,* 366 p., $10. Variety governs the leisurely archaeological essays in this honorary volume. The authors range the world for their subjects, and discuss Aeneas as a hero, the empire of the Incas, applications of tree ring analysis, and Babylonian records, and so on, all suitable here in view of Dr. Hewett's own broad interest in matters archaeological.

Science News Letter, July 15, 1939

Ethnology

RACE; A History of Modern Ethnic Theories—Louis L. Snyder—*Longmans, Green,* 342 p., $3. Written for the general reader, this timely book by a college history teacher, explains the development and present state of racial theories and controversies. He discusses not only German Nordic notions but also such matters as Pan-Africanism, Pan-Slavism, Mussolini's attitude toward race, and racialism in the United States.

Science News Letter, July 15, 1939

Bibliography

BOOKLIST BOOKS, 1938—*American Library Association*—64 p., 75 c. 10 or more, 65 c. This needs no introduction to librarians; the general public will find it invaluable as a buying and reading guide. Selected by the vote of many librarians, the 275 most important books of 1938 are grouped conveniently by subject.

Science News Letter, July 15, 1939

Fiction

ORDEAL—Nevil Shute—*Morrow,* 280 p., $2.50. Pertinent reading these days of perpetual crisis and air raid threats, this tells what happens to one family when England is blasted by enemy air bombing. Water supply failures, cholera and typhoid add to the horrors.

Science News Letter, July 15, 1939

Medicine

ORGANIZED PAYMENTS FOR MEDICAL SERVICES—Bureau of Medical Economics —*American Medical Association,* 182 p., 50c. Many of the plans developed within recent years for helping patients to get medical service without being swamped by the bills are described and analyzed in this publication. Physicians and others wishing to know at first hand what the American Medical Association thinks of these plans will want to read this account.

Science News Letter, July 15, 1939

•First Glances at New Books

Additional Reviews On Page 47

Geography

NEBRASKA; A Guide to the Cornhusker State—Federal Writers' Project—*Viking Press*, 424 p., $2.50. Seeing Nebraska is presented as a varied and interesting expedition for motor tourists in this new Federal guide.

Science News Letter, July 15, 1939

History

A HISTORY OF BRAZIL—João Pandiá Calogeras—*Univ. of North Carolina*, 374 p., $5. This translation of a well-known Brazilian historian's one-volume story of his country is timely, in view of growing interest in Pan-American problems. Calogeras has been called an original and vigorous thinker. He is also a writer who deals in colorful phrases and strongly painted pictures of the times he recounts.

Science News Letter, July 15, 1939

Physics

RÉUNION INTERNATIONALE DE PHYSIQUE-CHIMIE-BIOLOGIE, CONGRÈS DU PALAIS DE LA DÉCOUVERTE, Part II, Physique Nucléaire—N. Bohr, P. Scherrer, J. D. Cockcroft and W. Bothe—52 p., 11 fr., Part III, Rayons Cosmiques—J. Clay, P. M. S. Blackett and G. Lemaitre—36 p., 10 fr., *Hermann et Cie.*

Science News Letter, July 15, 1939

Botany

GERMAN-ENGLISH BOTANICAL TERMINOLOGY—Helen Ashby, Eric Ashby, Harald Richter and Johannes Bärner—*Nordemann*, 195 p., $3. This book, in form a rapid statement of the outlines of botany in parallel English and German texts, with bilingual registers of names at the end, is at once a unique thesaurus of botanical terminology in the two languages and a good language drill-book for both English-speaking and German-speaking students in the plant sciences.

Science News Letter, July 15, 1939

Physics

LE PRINCIPE DE CORRESPONDANCE ET LES INTERACTIONS ENTRE LA MATIÈRE ET LE RAYONNEMENT—Louis De Broglie—*Hermann & Cie*, 167 p., 10 fr.

Science News Letter, July 15, 1939

Geology

THE BIRTH AND DEVELOPMENT OF THE GEOLOGICAL SCIENCES—Frank Dawson Adams—*Williams and Wilkins*, 506 p., illus., $5. A most scholarly examination of all available documents bearing on knowledge and beliefs about the earth and its structure in ancient, medieval and early modern times. It will prove fascinating reading not only to geologists but to any one in whom a feeling for science and a sense of history are combined.

Science News Letter, July 15, 1939

Mathematics—Agriculture

ARITHMETIC IN AGRICULTURE AND RURAL LIFE—C. A. Willson—*Edwards*, 160 p., $1.80. How to compute the area of a field, the contents of a silo or bin, the payments due on a note, the calories in a bushel of corn or potatoes—highly practical problems like these will recommend this as a textbook to rural boards of education and should make the lessons at least endurable to the kids behind the desks.

Science News Letter, July 15, 1939

Botany

WONDER PLANTS AND PLANT WONDERS—A. Hyatt Verrill—*Appleton-Century*, 296 p., $3. This book is exactly what its title implies—a wonder book for the popular audience, without regard to age or degree of previous botanical knowledge.

Science News Letter, July 15, 1939

Horticulture

THE GENETICS OF GARDEN PLANTS—M. B. Crane and W. J. C. Lawrence—*Macmillan*, 287 p., $3.25. A reference book by two leading English workers goes into its second edition. Although designed primarily for use in Great Britain, it will be worth consultation by geneticists in other countries as well.

Science News Letter, July 15, 1939

Agriculture

AGRICULTURE AND FARM LIFE—Harry A. Phillips, Edgar A. Cockefair and James W. Graham—*Macmillan*, 496 p., $1.48. A well-organized textbook, intended to carry students in rural schools through a continuous and integrated two-year course.

Science News Letter, July 15, 1939

Geology

THIS EARTH OF OURS—Victor T. Allen—*Bruce*, 364 p., $3.50. Structural and historical geology, simply and straightforwardly presented and well illustrated. The book is well adapted for elementary classes as well as for general reading. The author, a member of the Society of Jesus, touches upon the dispute over evolution, stating that "The Catholic Church has adopted the wise policy of leaving the subject of evolution open for the present."

Science News Letter, July 15, 1939

Horticulture

HERBS, HOW TO GROW THEM AND HOW TO USE THEM—Helen Noyes Webster—*Hale, Cushman & Flint*, 156 p., $1. One of the most interesting of recent developments, in the field of home gardening, has been the return of herbs. This compact, well-illustrated book tells what herbs to plant and how to use them, and also gives generous samples of the lore and tradition inevitably associated with these ancient members of the garden community.

Science News Letter, July 15, 1939

Engineering

FARM MACHINERY—C. Culpin—*Chemical Pub. Co.*, 405 p., $7.25. This book is by an English author, but its applicability is world-wide. It should be read especially by those interested in the use of farm machinery in the North American continent, if only to get a fresh slant on their problems.

Science News Letter, July 15, 1939

Photography

AMATEUR FILM-MAKING—George H. Sewell—*Chemical Pub. Co.*, 114 p., $1.50. A book of British origin for the man who, like King George, likes to make movies of his family and his trips to show at home or in a small hall.

Science News Letter, July 15, 1939

Engineering

MACHINE DESIGN—Stanton E. Winston—*American Technical Society*, 333 p., $3. A text presenting those fundamentals of theory and analysis which are basic to the field of machine design.

Science News Letter, July 15, 1939

Physics

LES ÉLECTRONS LOURDS (MÉSOTONS)—Jean-Louis Destouches—*Hermann & Cie*, 70 p., 21 fr.

Science News Letter, July 15, 1939

Geology

THE STONE INDUSTRIES (2d ed.)—Oliver Bowles—*McGraw-Hill*, 519 p., $5. A new edition of a comprehensive and useful reference book about building stone and allied industries.

Science News Letter, July 15, 1939

Electrical Engineering

PRACTICAL ELECTRICITY—John Edmund Crawford—*Bruce*, 277 p., $1.96. An elementary text designed for the beginning student in vocational and industrial schools. The emphasis is on practical use of electricity, although something of a theoretical background is given the student.

Science News Letter, July 15, 1939